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AUTHOR	Cobb, Joseph A.
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ABSTRACT

As part of a continuing effort to find educationally relevant variables for handicapped children the present investigation focused on the relationship of observable behaviors to first grade achievement. Subjects were 134 first graders who were observed in reading and arithmetic periods (survival skills) for 10 to 14 days. The data collected were correlated with achievement as measured on standardized achievement tests. There was a moderate composite survival skill relationship. A stepwise regression analysis using specific aspects of survival skills behavior as independent variables and achievement scores as dependent variables was performed. In general, a relationship was found between social class, survival skills and first grade achievement. Lower class children were more variable and more predictable in their survival skills behavior than upper class children. The combined variables of sex of child and SES proved to be the most powerful predictors for achievement from survival skills. A mixture of stability and flux characterized the findings regarding survival skills across academic settings. The evidence gained in this study provides support for the theoretical significance of situational variables in accounting for behavior and points to the implications of the practical significance of searching out educationally relevant variables in the classroom environment. (WY)

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Center for Research and
Demonstration in the Early
Education of Handicapped Children
Clinical Services Building
University of Oregon
Eugene, Oregon 97403

and

Oregon Research Institute
488 11th Avenue East
Eugene, Oregon

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Survival Skills and First Grade Academic Achievement Report #1

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SURVIVAL SKILLS AND FIRST GRADE ACADEMIC ACHIEVEMENT

Joseph A. Cobb

University of Oregon and Oregon Research Institute

Introduction

As part of a continuing effort to find educationally relevant variables for handicapped children the present investigation focused on the relationship of observable behaviors to first grade academic achievement. First graders were observed in reading and arithmetic periods for 10 to 14 days and the data collected were correlated with achievement as measured on standardized achievement tests. The choice of observable behaviors as the primary focus of study was determined by clinical and theoretical research of the past decade. It was assumed that educationally relevant variables had to fit two criteria, one that the variables needed to have moderate relationships to a child's achievement and second that the variables were theoretically subject to change. Observable behaviors met the first criterion as recent evidence has shown moderate to high correlations between observable classroom behaviors and achievement (Meyers, Attwell, & Orpet, 1968; Lahaderne, 1968; Cobb, 1969). The behaviors that have been observed have been classified along a continuum of "attending to non-attending," or "task-oriented to non-task-oriented" (Lahaderne, 1968; Nixon, 1966). Classroom behaviors falling under the above rubrics have been successfully changed by the use of principles based upon learning theory

(Walker, Mattson, & Buckley, 1969; Patterson, Ebner, & Shaw, 1969; Cobb, Ray, & Patterson, 1970; Packard, 1970). Thus, the second criterion that the variables under investigation are theoretically subject to change has been amply demonstrated in the classroom.

Although prior studies have found that observable behaviors are consistently related to academic achievement and can be altered, a broader knowledge base seemed essential for theoretical and practical concerns. The theoretical issues were concerned with the effects of specificity of behavior on the prediction of achievement, and with the effects of sex and socio-economic class on the relationship between observable behaviors and achievement, and generalizability of behavior.

The Practical Issues

It was envisioned that the practical implications of the research effort could be derived from the answers to the theoretical questions. By finding those behaviors that were predictive of academic achievement, future research could use the results to plan procedures and strategies to alter the rates of appropriate first grade classroom behaviors and determine if concommitant changes occurred in the achievement level of first graders. Reading and arithmetic were the primary areas of concern due to Fitzsimmons, Cheever, and MacUnovick's (1969) findings that early difficulty in these areas is predictive of later school failure and dropping out. By finding educationally relevant parameters to these achievement areas perhaps inroads could be made on reversing the hitherto inexorable chain of failure. Additionally, it was envisioned that the assessment instrument developed to gather data on children's

levels of survival skills might be a sensitive tool for school personnel in screening children who are having learning and social problems within the classroom.

Specificity of Behavior

The pinpointing of specific survival skills, e.g., "compliance" and "volunteering" rather than global categories such as task-oriented behaviors, was dictated by principles derived from school intervention procedures using social learning principles in which teachers are taught to specify exactly what the specific behavior is that needs to be changed rather than engaging in broad categorizations involving many diverse behaviors (Cobb, Ray, & Patterson, 1970). By specifying discrete behaviors that are crucial to school survival the interventionist circumvents the labeling process and can concentrate on changing the child's behaviors. Another reason for focusing on specific behavior was global categories of appropriate and inappropriate classroom behaviors provide lower correlations with achievement than a combination of specific behaviors. For example, Cobb (1970) found three behaviors--"attending," "talking to peer about academic material," and "compliance"--that provided a multiple correlation of .61 with arithmetic achievement versus a correlation of .36 between a composite score of appropriate behavior and arithmetic achievement. It was hypothesized that the same disparity would hold for first graders in the present study.

Socio-Economic Status and Survival Skills

Socio-economic class has been a consistent correlate of academic achievement (Tyler, 1969). Children from the lower classes do more poorly in school than those from the middle and upper classes. Since previous results have shown moderate relationships between observable behaviors and academic achievement it was hypothesized that lower class children would have levels of appropriate survival skills lower than those of the children from higher socio-economic status. It was assumed that the lower class children needed to learn such basic behaviors as attending to their work, not being distracted by stimuli other than the task at hand, and complying with the teacher's requests and instructions. These basic behaviors were considered essential to the child surviving in the normal classroom environment; without such survival skills the child would be unable to profit from the learning environment.

The speculation for lower class children being deficient in these skills also came from studies describing the difference in terms of intellectual development between lower and middle class homes as well as studies of the prevalence of clinical disorders in young children from lower class homes. Zunich (1962) described the different role lower class in comparison to middle class mothers play in trying to help their children on intellectual tasks. The lower class mother seemed to be less a teacher and more passive to the child. A child reared in that kind of environment appeared less likely to learn the basic survival skills for successfully coping with the classroom

environment than one reared in a home where the mother played an active teaching role that was similar to that which the child would encounter upon entering the first grade. Not only have differences been noted in the home environment, but also in the number of emotionally handicapping syndromes among lower class children.

It is assumed that many children who have deficiencies in simple survival skills will find some means to cope with the classroom environment. The child who is placed on a very lean schedule of reinforcement upon entering the school system can find means of coercing the environment in order to receive higher rates of reinforcement. Walker (1970) has demonstrated the inequity of reinforcement given by teachers for appropriate and inappropriate behavior in the classroom. The child who is disruptive in the classroom receives three times as much teacher attention as the well-behaved child. It seemed clear that children lacking in survival skills would find some inappropriate responses such as "acting out" in order to obtain reinforcement from the classroom environment and that many of these children would come from the lower socio-economic status (White & Chary, 1966) as the responses that are necessary for achievement are missing in their repertoire.

It seemed equally true that children with other existing or potential handicapping conditions such as mild mental retardation and dropping out which are associated with lower socio-economic status would have lower rates of survival skills and for similar reasons; their prior environment had failed to equip them with simple survival skills that would allow them to take advantage of the academic opportunities offered by the regular school system. By attempting to find

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the relationship of specific survival skills to academic achievement, it was hoped that these children in future work could be helped to remain in the normal classroom and escape the educationally non-relevant labels that might further complicate and downgrade their educational development.

Sex, Survival Skills and Achievement

While socio-economic status was hypothesized to play a major role in the levels of survival skills behaviors and in the relationship of survival skills to achievement, it was hypothesized that another important component was the sex of the children. Studies of school children have consistently reported that boys far outnumber girls in being referred for acting out, disruptive, and hyperaggressive behavior in the classroom. McCaffrey and Cumming (1967) reported approximately twice as many boys who had been labeled as emotionally disturbed by their teachers. White and Chary (1966) found boys were referred to the school psychologist for acting out behavior in the classroom at a rate approximately four times higher than for girls. Therefore, it was hypothesized that boys would have lower rates of appropriate survival skills. As shown in Robins' work (1966) as well as McCaffrey and Cumming (1967), emotionally disturbed boys do poorly academically and one of the components that might explain their inadequate school performance is their lack of following teacher's instructions. As McCaffrey and Cumming illustrated, those boys who were labeled "emotionally disturbed" were described by their teachers in terms that indicated the child did not often comply with the teacher's request. Because the

proportion of boys classified as emotionally disturbed was higher than girls, the boys' behavior would probably have more effect upon a correlation and it was hypothesized that behaviors associated with following teacher instructions would have a higher relationship to academic achievement for boys than for girls.

Generalization of Survival Skills

Apart from the theoretical concerns regarding sex and socio-economic status and their effect on survival skills, the current investigation sought several answers to the complicated relationship between survival skills, achievement, and academic settings. Investigators have used different methodologies in gathering observational data that were later correlated with achievement measures. Some investigators observed children in one setting while others gathered data across many academic situations. Meyers, Attwell, and Orpet (1968) observed children in one testing situation and were able to relate their attending behavior to achievement in several academic areas. Cobb (1969) obtained scores of specific behaviors during arithmetic periods and used them to predict achievement in reading and spelling as well as arithmetic for fourth graders. Lahaderne (1968) observed sixth graders in many academic situations and used a single score on attending to obtain impressive correlations between attending and achievement in several areas. The nature of the procedures of collecting data by these investigators raised three main questions that were focused on in the current study.

The first and second questions had to do with the similarity of

predictors across situations. Was it true that the behaviors that were observed in the academic situation and found to be highly correlated with achievement in that achievement area were the same behaviors as those that were observed in another academic situation and found to be highly predictive of achievement pertinent to that academic area? For example, if "compliance" which had been observed during reading periods were found to be the best predictor of reading would it also be the best predictor of arithmetic based upon "compliance" data collected during arithmetic periods? In other words, was there a cluster of survival skills that were crucial to achievement regardless of the academic situation in which they were observed? Based upon the results of Lahaderne's (1968) work in which moderate correlations were found between achievement and observation data collected across many academic situations, it was hypothesized that some survival skills would be predictive in more than one academic area.

A related question regarding the similarity of predictors was based upon the work of Cobb (1969) and Meyers, Attwell, & Orpet (1968); their research indicated that behavior observed in one situation could be used to predict achievement relevant to a different academic area. For example, Cobb found that observational data collected in arithmetic could be used to predict achievement in reading and spelling, and that similar behaviors were predictive for reading and spelling that had been predictive of arithmetic. Therefore, it was hypothesized that the behaviors that were predictive of achievement in the situation that the survival skill data had been obtained would also predict achievement in another achievement area.

Not only were the relationships of behaviors to specific academic situations of concern but also the consistency or stability with which children exhibited behavior across academic situations. Lahaderne (1968) obtained for each child one behavioral score on attending that represented extensive observations across many academic settings. The scores were moderately correlated with standardized achievement tests in several areas.

Since achievement tests are highly correlated and children's scores on observable behaviors obtained across achievement areas provided moderate correlations, it seemed logical that children's behavior would show some consistency across academic settings. If children's behavior had been highly unpredictable from situation to situation, then the overall scores obtained by Lahaderne would be unlikely to be related to achievement measures. However, it was hypothesized that the correlations of children's behavior on specific survival skills from one academic situation to another would be in the low to moderate range due to change in situation. As Mischel has pointed out (1969), the person learns not only to generalize responses but also to discriminate from situation to situation. The child who receives reinforcement for high rates of attending in arithmetic may not be the same child who receives rewards for the same behavior during reading. Additionally, the situation may call for different kinds of survival skills in one setting than in another and the adaptive child will use the most appropriate behavior to the setting. For example, "volunteering" may be highly relevant to reading but not to arithmetic so the correlations between the behaviors for each setting may be low. The theoretical

importance of the three hypotheses regarding the generalization of behavior has relevance to learning theory and the practical implications have to do with intervention strategies which will be most efficient and effective in altering levels of survival skills.

If it could be demonstrated that behaviors are constant across academic settings, then it might be possible to set up general programs in the classroom to alter behaviors and ascertain if the behaviors generalized across settings. Current research evidence does not suggest that changing appropriate behavior in one academic setting does generalize to other academic areas (Barrish, Saunders, & Wolf, 1969). However, teachers trained in the use of social learning procedures could conceivably use the approach on similar behavior in diverse situations. The main point for practical implications of the present work was to find those behaviors that are relevant across situations and those that were specific so that the teacher, school psychologist, counselor, or whomever works in the classroom could have a basis upon which to concentrate on certain behaviors in order to keep as many handicapped children as possible within the normal classroom environment.

The present report covers some aspects of the relationship between first grade survival skills and achievement. An attempt was made to identify significant relationships that held across all first graders, as well as relationships that were idiosyncratic due to sex, socioeconomic status, and situational components.

Method

Subjects. First-graders in three elementary schools were observed during reading and arithmetic periods in the latter part of the academic year. Only subjects who were present for at least 70 per cent of the observations were included in the analysis. For reading, there were 150 subjects--87 females and 63 males; for arithmetic, there were 135 subjects--80 females and 50 males.

Achievement Tests. The Stanford Achievement Test, Primary I Battery, Form W was administered to all subjects within one week of the classroom observations. Means of the subtests--Word Reading, Paragraph Meaning, Vocabulary and Word Study Skills--were used for an overall reading score. The arithmetic score was taken directly from the test results.

Observations. Although nineteen observation codes were used in gathering data, due to the infrequency with which four of the codes occurred, only fifteen were used in the arithmetic analysis. For reading, in addition to deleting four infrequent codes, the code, "talk to teacher positive" (TTP), was not included when specific survival skills were analyzed. TTP was found to have a high negative correlation (-.53) with reading group size. Children in the smaller groups spent a larger percentage of their time talking with the teacher about academic material than children in larger groups, due to the greater opportunity to interact in small groups. For example, a few children had individualized reading groups in which there was a one to one interaction with the teacher, and these children spent 100% of their time in TTP.

However, children in reading groups of eight in size spent approximately 16% in TTP. Due to the confounding of reading group size and TTP, the code was only used to arrive at composite scores, but never employed in specific survival skill analysis.

The codes were divided into appropriate and inappropriate survival skills (Table 1). The appropriate survival skills were: approval (AP), attention (AT), compliance (CO), initiation to teacher (IT), talk to teacher positive (TTP), talk to peer positive (TPP), and volunteering (VO); inappropriate survival skills were: look around (LO), inappropriate locale (IL), noncompliance (NC), not attending (NA), play (PL), self-stimulation (SS), talk to teacher negative (TTN), and talk to peer negative (TPN). The grouping of specific categories into appropriate and inappropriate was similar to the categories "attending" and "non-attending" of Lahaderne, 1969) and to "task-oriented" and "non-task-oriented" of Nixon's, 1966). Earlier evidence (Cobb, 1969) demonstrated that defining several specific behaviors resulted in higher predictiveness of academic achievement than by the use of more encompassing categories. The present study was designed to provide additional evidence regarding the use of global and/or more specific classroom behavioral categories.

Observer reliability. Five professionally trained observers coded the children's classroom behaviors. They were originally trained a year earlier in four 1-hour sessions, using a television tape of children working in an academic setting. Slight modifications occurring in an earlier version of the coding session required one additional training session for the present study. At the end of the four 1-hour sessions,

TABLE 1

Brief Definition of Survival Skills

APPROPRIATE	INAPPROPRIATE
Approval (AP): used whenever a person gives clear gestural, verbal, or physical approval to another individual.	Inappropriate Locale (IL): used when not in his appropriate place.
Attention (AT): Pupil is doing what is appropriate in an academic situation... used only when other work-oriented categories are not applicable.	Look Around (LO): Pupil is looking around the room, out the window, staring into space.
Compliance (CO): Pupil does what teacher requests.	Non-compliance (NC): Pupil does not do what is requested by the teacher.
Initiation to Teacher (IT): Pupil indicates to teacher he wants some assistance in academic work.	Not-attending (NA): Pupil is not attending to the assignment and no other category is appropriate.
Talk to Peer Positive (TPP): Pupil talks to another student about academic material.	Play (PL): Pupil is playing with another pupil while the teacher is presenting material to the class.
Talk to Teacher Positive (TTP): Pupil talks to teacher about academic material.	Self-stimulation (SS): Pupil stimulates himself (e.g., scratches, rubs pencil on desk, feels material in his clothing) to such an extent that he is not paying attention to the assignment.
Volunteering (VO): Pupil raises hand in response to teacher's question.	Talk to Peer Negative (TPN): Pupil talks to peer about non-academic material.
	Talk to Teacher Negative (TTN): Pupil talks to teacher about non-academic material.

observer reliability was calculated by the per cent method. The observer had to agree by code category, as well as subject and sequence, with a master sheet which had been previously coded by the trainer. To arrive at the individual observer reliability, the number of agreements was then divided by the total possible number of agreements. In the fourth and final television session, the average reliability was 85%.

Actual classroom observations occurred during arithmetic and reading classes in eight first-grade classrooms in three elementary schools. Each child was observed for a six-second interval. Then, the observer watched the next child for six seconds until every child in the classroom had been coded; then, the sequence began again. A variation occurred in reading in seven of the eight classrooms; reading was taught in small groups, and only the children within a reading group were coded rather than all children present in the classroom. The observer coded those in each reading group as they interacted with the teacher; children who were involved in other tasks were not coded until their reading group was instructed by the teacher. Observers coded behavior throughout the arithmetic period and during the time the teacher focused on each reading group. The observers did not know the children's names, since they were assigned numbers according to a seating plan made by the teacher before the observational phase of the study began. Additionally, the observers were unaware of the achievement levels of the subjects.

One observer was assigned to each classroom. A reliability observer coded every third day with the regular observer to obtain constant

Table 2

Mean Observer reliability by survival skill code in reading and arithmetic.

Mean reliability across all codes including four low-frequency codes not listed.

Subject	Survival Skill Code															
	AP	AT	CO	IT	TPP	TTP	VO	IL	LO	NC	NA	PL	SS	TPN	TTN	X
Reading	.99	.97	.99	.87	.87	.79	.92	.99	.91	.55	.92	.98	.98	.95	.99	.98
Arithmetic	-	.95	.99	.99	1.0	.97	.99	1.0	.91	.93	1.0	1.0	1.0	.99	1.0	.99

checks on all observers throughout the study. When the reliability checks were obtained, both observers coded the children's behavior simultaneously, but independently. The inter-observer reliability across codes was .91 by the percent method; and .98 for reading; and .99 for arithmetic by the Pearson Product Moment Correlation (Table 2). The consistently higher reliabilities over previous studies (Cobb, 1969) were attributed to the observer's experience in the field.

Subject's percentage of observable behaviors. Data was collected on subjects in arithmetic and reading periods for a minimum of ten days in two schools, and up to fourteen days in the third school. Subjects who were absent more than 30 per cent of the time were excluded in the data analysis. The percentage of time engaged in a survival skill was calculated for each student in the following manner: The sum of frequencies for each behavior across all observation schedules was made; the obtained sum was divided by the total number of all behaviors; the percentages were then used in each statistical analysis.

Statistical Analysis. Percentages obtained on the fifteen survival skills and percentile scores on the reading mean and arithmetic test were subjected to various analyses by the BMD02R Stepwise Regression Program of the Health Science Computing Facility, UCLA. The program is designed to select one independent variable at a time--the one that provides the greatest contribution in accounting for the variance of the dependent variables. Cross validation procedures were accomplished by applying the regression equations obtained on part of the sample to

another part. The obtained scores were then correlated with the actual achievement scores to determine the validity of the regression equations.

Socio-economic status. The socio-economic status (SES) of each child was determined by using the seven-point scale developed by Warner, Meeker, & Eells (1960). The father's occupation was used as the criterion for assigning a ranking on SES, as the developers of the scale have shown a correlation of .91 with more detailed determinants of SES (Werner, Meeker & Eells, 1960). The higher numbers (5-7)are typically used for medium, semi-skilled, and migrant workers. The lower numbers (1-3) are generally applied to college-trained people assuming professional or supervisory responsibility. The schools differed in SES composition. School I had more children in the higher SES categories and fewer in the lower than was true for School II and III (Table 3). Three judges independently ranked each child on SES; the mean was 58% for perfect agreement. The mean agreement allowing for a discrepancy of one rank was 97%. When it became necessary for analysis, to divide the sample by SES groupings, the judges' agreement suggested a way of maximizing reliable ratings. The sample was split into two groups; higher SES consisting of category numbers 1, 2, and 3; lower SES consisting of category numbers 5, 6, and 7. Since children placed in category 3 were unlikely to be placed in category 5, and vice versa, by any of the judges, the two groups were relatively free of judges' unreliability.

The present study attempted to find meaningful relationships between survival skills and first grade academic achievement. The relationships were examined across all children, across achievement areas in reading

Table 3

Socioeconomic status of pupils by school classified by Warner, Meeker, & Eells Occupational Index (1960)

		School I	School II	School III	
SES Ranking	1-3 (upper class)	24	22	3	49
	4	11	15	1	27
	5-7 (lower class)	18	30	26	74
		53	67	30	150

and arithmetic, by sex, by SES, and various combinations of the preceding. It was anticipated that the results would lay the groundwork for formulating strategies to help handicapped children adjust to and benefit from the normal classroom environment.

RESULTS

Composite Survival Skills and Achievement for First Graders

The first analysis concentrated on the relationship of composite survival skill scores and first grade achievement for 134 first graders for whom reading and arithmetic data were available. For each first grader, the percentage of time spent in each appropriate skill was summed up to arrive at a composite percentage which reflected the total time engaged in appropriate survival skill behaviors. Separate summations were calculated for reading and arithmetic. The composite survival skill score for reading was then correlated with the reading achievement score; the same procedure was done for arithmetic. The correlations were .31 between survival skill scores and arithmetic scores, and .42 between survival skill scores and reading achievement (Table 4). The correlations, while moderate, were in the predicted direction and gave some indication of a useful technique for assessing behavioral correlates of academic achievement.

The moderate correlations were impressive when considering the high mean percentage of time first graders exhibited appropriate classroom behaviors (Table 4). The mean percentages of 82% for arithmetic and 86% for reading indicated that most children had acquired an overall competence in classroom survival skills. At the same time, the standard deviation of 8% for arithmetic and 11% for reading suggested that children at the lower end of the distribution were engaging in inappropriate behaviors at above average rates and had not acquired adequate survival skill levels to maximize learning academic material. Not only were some

Table 4

Mean and Standard Deviation of Percentages of Time First Graders Engaged In Appropriate Survival Skill Behaviors and Correlation between Percentages and Reading and Arithmetic Achievement. Mean Percentile Achievement Level and Standard Deviation as Measured by Stanford Achievement Test. (N = 134.)

	Arithmetic	Reading
Mean percentage of appropriate survival skill behaviors	82%	86%
Standard deviation	8%	11%
Mean percentile achievement level	57%	47%
Standard deviation	27%	27%
Correlation of composite appropriate aurvival skill behaviors and achievement	r=.31****	r=.42****

****p ≤.0005

children exhibiting survival skills at lower rates, but the achievement levels indicated many children were already performing poorly academically. The mean for the 134 first graders was at the 57th percentile for arithmetic and at the 47th percentile for reading. This was within the average range for first graders nationally. The standard deviation of 27 percentile points for both reading and arithmetic achievement indicated that several children were performing below the 21st percentile in reading and arithmetic.

An examination of the frequency distribution indicated that in reading, 20% and in arithmetic, 10% of the first graders were achieving below the 21st percentile. Further examination indicated that 11 of the children, or 8% of the group were achieving below the 21st percentile on both achievement tests. The high correlations found between group intelligence tests and standardized achievement tests, such as the Stanford Achievement Test, suggested that some of these children were performing at levels that might place them in the mentally retarded range on group intelligence tests. If it were conceivable to pinpoint specific survival skills that had higher correlations with the achievement measures than the moderate ones found for the composite skills, a means of working with children in the lower I.Q. ranges might be formulated.

Specific Survival Skills and Academic Achievement for First Graders

Even though the composite survival skill relationship to academic achievement was moderate, it had been hypothesized that a combination of specific appropriate and inappropriate survival skills would produce stronger relationships. Therefore, a stepwise regression analysis using

specific survival skills as independent variables and achievement scores as dependent variables was performed. Because of the method used in selecting variables to enter the regression equation, only variables that increased the amount of variance by at least 5% from the previous step in the regression analysis were reported. After the regression analysis had selected the most powerful predictor, partial correlations between the remaining independent variables and the criterion were computed. Then, the variable with the highest partial correlation was selected to enter the regression equation. It was assumed that some independent variables that accounted for less than 5% of the variance were due to sampling error and added "noise" to the analysis; therefore, once the analysis had arrived at a step where a variable added less than 5%, the remaining variables were not considered as predictors.

The separate regression analysis for reading and arithmetic achievement produced two survival skills for each achievement area and in each case the variables were correlated in the predicted direction (Table 5). For arithmetic, the survival skills were "look around" and "compliance"; the multiple R was .42. For reading, "attending" and "volunteering" produced a multiple R of .59. Not only were all skills in the predicted direction (i.e., inappropriate survival skills had a negative relationship with achievement and appropriate skills a positive relationship), but the combination resulted in higher correlations with reading and arithmetic achievement than was possible using the composite survival skill score. The correlation in arithmetic increased from .31 to .43, and in reading, from .42 to .59. These findings replicated previous results by the investigator. A composite score of appropriate behaviors

Table 5

Name of Arithmetic and Reading Predictors that Accounted for More than Five Percent of the Variance in Order of Entrance into Stepwise Regression Equations with r's, R's, and Sign of Zero-Order r's for each Predictor. List of Significant ($p < .01$) Zero-Order Correlations between Survival Skills and Achievement. (N = 134)

Arithmetic			Reading		
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
negative	LO	.33 r	positive	AT	.45 r
positive	CO	.42** R	positive	VO	.59** R

	Arithmetic		Reading	
	Survival skill	r	Survival skill	r
Significant zero-order correlations between specific skills and achievement	CO	.28	VO	.42
	AT	.23	AT	.47
	LO	-.33	PL	-.24
	NA	-.22	LO	-.41
	(VO	.06)[a]	NA	-.38
			(CO	.12)[a]

** $p < .01$

[a] Behaviors in parentheses are not significant at .01 level but are included to provide comparison with major variables in other achievement regression equation.

correlated .36 with arithmetic achievement for fourth graders, while three behaviors, "attending," "talk to peer about academic material," and "compliance," produced a multiple R of .61 (Cobb, 1970). The pinpointing of specific survival skills has important implications for the teacher; rather than concentrating on a global category which consists of several discrete behaviors, the teacher can focus on one or two simple survival skills that are relatively easy to define and change. For example, knowing that "compliance" is related to achievement, the teacher might set up some simple program to increase children's rates of following her instructions. If more molar categories are used, pinpointing and change would possibly be more difficult.

Although the survival skills seemed to be different for reading than for arithmetic, a closer analysis revealed some major similarities between skills for each area. The most powerful predictors, i.e., the survival skills that entered the regression equation before all other predictors, were also significantly related to achievement in other areas. Because of the nature of the regression analysis, the similarities were masked. Therefore, the zero-order correlations were examined (Table 5). The survival skill "look around," which was the most powerful predictor for arithmetic, had a significant correlation of -.41 with reading achievement. "Attending," which was highly predictive of reading achievement, was significantly correlated with arithmetic achievement. The reason that "look around" did not enter the regression equation for reading prediction was its high correlation of .75 with "attending." "Attending" had a correlation of .47 with reading achievement, and entered the stepwise regression equation first. Once

"attending" had entered the equation, the partial correlation of "look around" with reading achievement was substantially reduced due to its high correlation with "attending." Thus, "look around" was a moderate predictor for both achievement areas, but did not enter the regression equation for predicting reading due to its correlation with "attending." Although the disparity between zero-order correlations and achievement was larger, the same situation existed which precluded "attending" entering the regression equation for arithmetic achievement. A high correlation of "look around" and "attending" reduced the possibility of "attending" entering the regression equation once "look around" had become the most powerful predictor.

The consistency of first order predictors across academic areas indicated that some behavioral components are required for academic success regardless of the subject matter being taught. In retrospect, the fact seemed obvious that some survival skill behaviors were essential across academic areas. Other investgators, using more global categories, have used one score based on observations of children in different academic settings and obtained moderate relationship with several achievement areas (Lahaderne, 1968). The global categories included the specific behaviors "attending" and "look around," found in the present investigation to be significantly related to both reading and arithmetic achievement. The present findings suggest that some behaviors must be taught and maintained by the classroom environment across academic areas if children are to achieve.

The second most powerful predictors--"compliance" for arithmetic achievement and "volunteering" for reading achievement--resulted in real

differences that were independent of the regression analysis. "Compliance" had a correlation of .28 with arithmetic achievement and a non-significant relationship to reading achievement. "Volunteering" had a correlation of .42 with reading achievement and a non-significant relationship to arithmetic achievement. The data indicated that the second most powerful predictors were situation specific across first graders. The child who volunteered to read and answer questions about the reading material was more likely to succeed than the one who sat back and let his peers engage in volunteering behavior. But "volunteering" in arithmetic had little relationship to arithmetic achievement; so, whether a child engaged in volunteering behavior was inconsequential to achievement. It might have been assumed that the percentage of time engaged in "volunteering" may have attributed to the difference in the findings. However, the percentage of time children engaged in volunteering were the same; the means for arithmetic and for reading were both 2.9%. The percentages suggested that some fundamental aspect of the learning situation accounted for the difference. It may be that "volunteering" in reading allows the child to practice more verbal skills that are necessary for overall language development, but "volunteering" in arithmetic does not lead to further cognitive development in acquiring mathematical concepts. The finding that "volunteering" was unrelated to arithmetic achievement for first graders replicated earlier results obtained on the relationship of survival skills to arithmetic achievement for fourth graders (Cobb, 1970). Volunteering was not a major correlate of arithmetic achievement. More detailed observation of the phenomena, e.g., what is the content of the volunteering response, may lead to clearer understanding of the

differential effects of "volunteering" on achievement.

Earlier results between the relationship of survival skills and arithmetic achievement of fourth graders were also replicated for "compliance," the second most powerful predictor for first grade arithmetic achievement. Cobb (1969) found "compliance" to be a major predictor of fourth grade arithmetic achievement. A possible reason that the significant relationship of "compliance" to arithmetic success for first graders was not found with reading achievement was suggested by an analysis of time engaged in compliance behavior during reading and arithmetic periods. First graders spent a different percentage of time in complying with teacher's request in arithmetic than in reading--2.1% versus 2.6% respectively; and only in arithmetic was the relationship to achievement significant.

The difference may be attributed to the ease of teacher management in reading groups versus arithmetic classes. Observation data for reading were collected only while the teacher was interacting with small groups. As was noted the appropriate behavior for reading was 86% versus 82% for arithmetic. The data for arithmetic which were gathered during the entire arithmetic period consisted of the teacher giving instructions and presenting material to the entire class; and all of the children engaging in individual seat work. The possibility for "compliance" not to occur seemed to be higher in arithmetic when the teacher had three to four times the number of children to observe than during small reading groups. Some support for the hypothesis of group size affecting compliance was the ratio of "compliance" to "noncompliance." During reading, the ratio was 6 to 1 and during arithmetic it was 4 to 1.

Thus, it seemed possible that children might be able to escape the teacher's surveillance and ensuing censure in arithmetic more readily than in the small reading groups.

The implications of the specificity of the relationship between second order predictors and subject areas to helping handicapped children suggests tailored methods and early intervention. For example, the teacher might spend more time checking that each child is following her instructions in arithmetic. If she asks them to open their books to a certain page, she might check that every child has done so before going on to the next step in her presentation. Having peers check on each other might be another method to assure that all children are following instructions. From clinical observations of hyperaggressive boys in normal classroom, an overriding fact emerged which the present data supported. Many emotionally disturbed children have never learned how to follow instructions in large groups. A worthwhile goal for the educator is to teach these survival skills before the child acquires strong competing responses which result in the label of "emotionally disturbed," "hyperaggressive," or "hyperactive."

Survival Skill Predictor Observed in One Academic Situation Applied to Achievement in a Different Academic Area

While the first major analysis indicated that some survival skills were correlated with achievement in both arithmetic and reading, a further concern was the relationship of survivals skills observed in one academic setting to achievement in a different area. Was it true that a child's behavior in arithmetic was related to his achievement in reading? To answer the question, two regression analyses were performed

on data of 134 first graders for whom both arithmetic and reading achievement data were available.

Survival skill data collected in arithmetic were used as independent variables in predicting reading achievement, and survival skill data in reading were used to predict arithmetic achievement (Table 6). The survival skills which originally had predicted reading--"attending" and "volunteering"--also entered as the first and second most powerful predictors for arithmetic achievement. The multiple R was .49. The predictors for reading achievement, from survival skill data gathered in arithmetic, were "compliance" and "attending," and produced a multiple R of .44. "Compliance" had been one of the predictors in arithmetic but "attending" had not entered the regression equation. However, a comparison of the zero-order correlations of survival skills observed in arithmetic, with achievement in reading and arithmetic, indicated that the magnitude of the correlations was similar; "attending" had a correlation of .22 with arithmetic achievement and .25 with reading achievement; "compliance" had a correlation of .29 with arithmetic achievement and .36 with reading achievement. The major difference in the regression equation was the replacement of "look around" by "attending" which seemed to be due to the lower zero-order correlation of "look around" with reading achievement (-.23) than had been true for arithmetic achievement when the correlation was -.34. A test of the difference in the correlation for "look around" indicated that a significant difference existed. Thus, except for "look around," the variables that had been predictive for achievement within the area observed were also predictive across areas. The survival skill "attending" came forth as a major predictor

Table 6

Name of Reading Predictors from Arithmetic Observational Data and Name of Arithmetic Predictors from Reading Observational Data. Predictors Tested in Order of Entrance into Stepwise Regression Equation with r's, R's, and Sign of Zero-Order r's for each Predictor. List of Significant ($p < .01$) Zero-Order Correlations between Specific Survival Skills and Achievement. (N = 134)

Arithmetic			Reading		
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
positive	AT	.44 r	positive	CO	.36 r
positive	VO	.49** R	positive	AT	.44** R

	Arithmetic		Reading	
	Survival skill	r	Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	VO	+.29	CO	+.36
	AT	+.44	AT	+.25
	PL	-.28	PL	-.27
	LO	-.32	LO	-.21
	NA	-.22	NA	-.25
	(CO	+.05)[a]	(VO	+.06)[a]

** $p < .01$

[a] Behaviors in parentheses are not significant at .01 level but are included to provide comparison with major variables in other achievement regression equation.

in both achievement areas which indicated that the skill was consistently related to achievement. Cobb (1970) found that attending behavior observed during arithmetic was one of the most powerful predictors of arithmetic as well as reading achievement for fourth graders. For the practitioner working in the classroom, it seems clear that attending should be given major priority in setting up programs to help children achieve academically.

Survival Skill Consistency for First Graders Across Situations

A related question to that of the consistency of the predictors across situations was the consistency with which children exhibited survival skills in different academic areas. Was it true, for example, that children who had high percentages of "attending" in reading also exhibited high rates in arithmetic? For 134 first graders, percentages for survival skill in reading were correlated with those of arithmetic (Table 7). The composite survival skill percentages were also correlated for each achievement area. The correlation was .35 for appropriate survival skills in one area, with composite appropriate survival skills in the other achievement area.

Some specific skills produced moderate correlations which seems to indicate evidence for support of a "trait" notion; that is, children in relation to other children maintain their relative positions in percentage of time engaged in a specific behavior across settings. The behaviors of interest in working with handicapped children who have been diagnosed as hyperaggressive, emotionally disturbed, or oppositional, are "compliance" and "noncompliance." Clinicians and researchers working with this population often zero in on these variables early in any

Table 7

Correlations between Percentages of Survival Skill Behaviors Observed In Reading Groups and the Same Skills Observed In Arithmetic Periods. (N = 134)

AP (approval)	.16*
CO (compliance)	.57****
VO (volunteering)	.45****
IT (initiation to teacher)	.21**
AT (attention)	.37****
NC (non-compliance)	.50****
PL (play)	.47****
TTN(talk to teacher negative)	.57****
TPN(talk to peer negative)	.29****
IL (inappropriate locale)	.19*
SS (self-stimulation)	.41****
LO (look around)	.23***
NA (not-attending)	.29****
Mean Correlation	.39****
Composite Appropriate Survival Skills	.35****

* $p < .05$
** $p < .01$
*** $p < .005$
**** $p < .0005$

treatment program (Patterson, Cobb, & Ray, 19701 Wahler, 1969). These variables had correlations of .57 and .50 across situations indicating some consistency in these survival skills. As had been demonstrated, "compliance" was a major predictor of arithmetic achievement, and it seems likely that some of these first graders have already exhibited certain behaviors in academic situations that are detrimental to achieveing and will lead to a label of hyperaggressive, emotionally disturbed, or hyperactive if the pattern of behavior continues. In order to help these potentially handicapped children, both academically and socially, it would behoove interventionists to teach children, as soon as possible, ways in which to follow the teacher's directions.

Socioeconomic Status and First Grade Academic Achievement

To determine the effect of socioeconomic status on the relationship of survival skills to achievement, two series of analyses were performed on data available from 135 children in arithmetic and 150 children in reading. First, regression analysis was performed on the school whose mean socioeconomic status was between the mean for the other two schools in the sample. The regression equation was then applied to data from each school, and the resultant predictive achievement scores were correlated with actual scores to provide cross validation of the results (Table 8). The school chosen was School II, as the mean for socioeconomic status was between that of School I, which had more children of higher SES, and School III, which had more children of lower SES. The most powerful predictor for arithmetic achievement was "look around," followed by "noncompliance" and "compliance." All skills had correlations in the

Table 8

Name of Reading and Arithmetic Predictors that Accounted for More Than Five Percent of the Variance in Order of Entrance into Stepwise Regression Equation with r's, R's, and Sign of Zero-Order r's for each Predictor. Cross Validated r's Using Regression Equations from School II on School I and School III.

School	Sign of zero-order correlation	Survival Skill	r and multiple R	Cross validated r
Arithmetic				
School I	-	TPP	.57r	-.07 n.s.
N=53	+	TPN	.63R**	
School II	-	LO	.44r	
N=51	-	NC	.50R	
	+	CO	.56R**	
School III	-	LO	.33r	
N=31	-	NC	.41R	+.38*
Reading				
School I	+	VO	.27r	+.09 n.s.
N=53	+	AT	.39R	
	+	TPN	.51R	
	+	AP	.56R	
	+	CO	.61R	
	-	TPP	.70R**	
School II	+	AT	.40r	
N=67	+	IT	.48R	
	-	TPN	.52R**	
School III	+	AT	.67r	
N=29	+	CO	.74R	
	+	PL	.79R**	+.62****

* p .05
** p .01
**** p .0005

predicted direction: "look around" and "noncompliance" were negative, and "compliance" was positive. The final multiple R, using the three variables, was .56 which was higher than the multiple R of .43 for the entire sample. On cross-validation, the correlation between actual and predicted achievement was non-significant for School I and .38 for School III. The different results for each school on cross validation suggested that other behaviors may be more predictive for School I than those found for School II and School III. Regression analyses were run for School I and School III, and the behaviors are markedly different for School I, but not for School III. The direction of the relationship is reversed from the predicted direction for School I; "talk to teacher about academic material" was negative, and "talk to peer about non-academic material" was positive; both behaviors provided a multiple R of .63.

The same procedure was used to cross-validate survival skills in reading as was done in arithmetic. The most powerful predictor found in School II was "attending" followed by "initiation to teacher" and "talk to peer about non-academic material"; the final multiple R was .52. On cross validation, the R was .62 for School III and nonsignificant for School I. Quite clearly, the behaviors in both areas are similar for School II and III in predicting achievement, and reflect the results obtained for the entire sample, but School I provided evidence that other behaviors may be important in predicting achievement.

To further unravel the relationship between socioeconomic status and survival skill predictors for achievement, the children were grouped into high SES which was comprised of students whose fathers' occupations were classified as 1, 2, or 3 in the Warner, Meeker, and Eells'

classification system; low SES was defined as children whose fathers' occupations were classified as 5, 6, 7. The number 4 classification was left out because of the low reliability of raters in discriminating between adjacent categories and the high agreement between raters for judging SES two ranks apart.

Several consistencies were noted in the comparison between lower SES and higher SES in survival skills and achievement (Table 9). In both reading and arithmetic, higher SES had higher means of appropriate survival skills than was the case for lower SES. In arithmetic, the higher SES children exhibited appropriate behaviors 86% of the time versus 80% for lower SES children; in reading the higher SES children spent 90% of their time doing appropriate behavior versus 83% for the lower SES children; the standard deviations were 33% to 54% smaller for the higher SES children. Further analysis, as presented in Table 10, of the distribution of appropriate behavior for each SES group revealed striking differences in the amount of time children of each SES group engaged in suitable survival skill behavior. Only 6% of the higher SES children in reading and 12% in arithmetic spent less than 80% of their time engaged in appropriate survival skill activities. In sharp contrast, 25% of the lower class children during reading time and 49% during arithmetic periods were spending less than 80% of the time in appropriate survival skill behavior. The difference between the two groups tested by chi-square were highly significant and supported the hypothesis that lower class children would have lower levels of survival skill behaviors than their higher class peers.

The marked differences between the two SES groups were further

Table 9

Mean and standard deviation of percentage of time high and low socio-economic status first graders engaged in appropriate survival skill behaviors, correlation between percentages of time and reading and arithmetic achievement, mean percentile achievement level as measured by Stanford Achievement Test.

	Arithmetic			Reading		
	High SES N=41	Low SES N=70		High SES N=48	Low SES N=74	
Mean percentage of appropriate survival skill behaviors	86%	80%	Mean percentage of appropriate survival skill behaviors	90%	83%	
Standard deviation	6%	9%	Standard deviation	6%	13%	
Mean percentile achievement level	72	48	Mean percentile achievement level	60	36	
Standard deviation	24	26	Standard deviation	21	25	
Correlation of composite appropriate survival skill behaviors and achievement	.04 n.s.	.35***	Correlation of composite appropriate survival skill behaviors and achievement	.05 n.s.	.47****	

***p ≤ .005
****p ≤ .0005

Table 10

Chi-square analysis comparing children of low socio-economic status and high socio-economic status on percentage of time engaged in appropriate survival skill behavior during reading (N=123) and arithmetic (N=111) activities.

Reading

		High (1-3)	Low (5-7)	
Percentage of composite survival skill behavior	0 - 80%	3 (6%)	19 (25%)	22
	81%-100%	45 (94%)	56 (75%)	101
		48	75	123

$X^2 = 7.25$ $p < .01$

Arithmetic

		High (1-3)	Low (5-7)	
Percentage of composite survival skill behavior	0 - 80%	5 (12%)	34 (49%)	39
	81%-100%	37 (88%)	35 (51%)	72
		42	69	111

$X^2 = 16.0$ $p < .001$

substantiated from the results of the achievement testing on the Stanford Achievement Test. As shown in Table 9, the mean reading and arithmetic achievement level for the higher SES children was approximately 25 percentile points above that of the lower SES children. Further analysis revealed how wide the gap was that existed between the two groups. As shown in Table 11, a larger proportion of the lower class children fell below the 20th percentile point on both reading and arithmetic achievement than was true for the higher SES group. In terms of percentages three to seven times as many first graders from the lower SES group perform at severely inadequate levels in comparison to the higher SES first graders. At the top of the distribution, from the 71st to the 100th percentile point the higher SES children outperformed the lower class group by a margin of three to one in both reading and arithmetic. The differences between the two groups produced highly significant chi-squares. These findings, which were simply a replication of what was consistently found in the educational literature, coupled with the findings on survival skill distribution for high and low SES first graders, provided strong support for the hypothesis that the groups come to school with different behavioral repertoires and that many of the future and current handicapped children may simply be untrained in the skills necessary to cope with the classroom situation.

Further support for the role of survival skills as affected by SES was noted by the moderate correlations of .35 for reading and .47 for arithmetic between the composite survival skill score and achievement for lower class children. For the higher class first grader, non-significant relationships were noted. The homogeneity of variance in

Table 11

Chi-square analysis comparing first graders of low socio-economic status and high socio-economic status on achievement in reading (N=123), and arithmetic (N=111), as measured by the Stanford Achievement Test.

Reading

Percentile level on Reading Achievement Test	High (1-3)	Low (5-7)	
0 - 20%	2 (4%)	25 (34%)	27
21%- 70%	29 (59%)	40 (54%)	69
71%-100%	18 (37%)	9 (12%)	27
	49	74	123

$X^2 = 20.09$ $p < .001$

Arithmetic

Percentile level on Arithmetic Achievement Test	High (1-3)	Low (5-7)	
0 - 20%	2 (5%)	11 (16%)	13
21%- 70%	13 (31%	42 (61%)	55
71%-100%	27 (64%)	16 (23%)	43
	42	69	111

$X^2 = 18.89$ $p < .001$

composite survival skill activity as presented in Table 9, and the nature of the distribution as presented in Table 10, clearly indicated that gross measures of survival skills are inadequate to differentiate achievement levels among high SES first graders. On the other hand, lower SES children presented enough variability in composite survival skill behavior to provide highly significant relationships between the overall measure and achievement.

To illustrate the variability among lower SES children and the importance of survival skill behaviors to achievement for these children, a chi-square analysis was done on the relationship of composite skill scores to achievement in reading and arithmetic for the extreme ends of the achievement distribution (Table 12). Eighty-two percent of the children who were performing below the 21st percentile in reading spent less than four-fifths of their time in appropriate behaviors. In contrast only 38% of the children who were performing above the 70th percentile in arithmetic spent less than 80% of their time in suitable survival skill behaviors. Similar differences between the high and low achievers were noted in reading; 60% of the low achievers versus 0% of the high achievers spent less than 80% of their reading periods in appropriate survival behaviors. These significant results strongly suggest that those children at the lower end of the distribution in achievement need assistance in acquiring more competent classroom behaviors early in their school careers if they are to derive any academic skills from the classroom experience.

The results for SES separation indicated the importance of considered SES as a major discriminator in relating specific survival

Table 12

Chi-square analyses of lower socio-economic status children's achievement in arithmetic (N=36), and reading (N=27), to composite survival skill scores.

Arithmetic

Percentile score on Arithmetic Achievement Test

		0 -20	71-100	
Percentage of time engaged in appropriate survival skill behaviors	0 - 80%	9 (82%)	6 (38%)	15
	81%-100%	2 (18%)	10 (62%)	12
		11	16	27

$X^2 = 3.94$ $p < .05$

Reading

Percentile score on Reading Achievement Test

		0 -20	71-100	
Percentage of time engaged in appropriate survival skill behaviors	0 - 80%	15 (60%)	0 (0 %)	15
	81%-100%	10 (40%)	9 (100%)	19
		25	9	36

$X^2 = 8.82$ $p < .01$

skills to achievement (Table 13). The behaviors for the upper SES group produced a multiple R of .62 for arithmetic achievement, and the behaviors in order of their entrance into the regression equation were "talk to teacher about non-academic material," "play," "attending," and "talk to teacher about academic material." The first two skills were in the predicted direction, and the latter two in the opposite direction. For lower SES children, the relationships were similar to those found for School II and School III; "compliance" and "look around" provided a multiple R of .57 with arithmetic achievement. The possibility of cross validating the results was negated by examining the zero-order correlations within each sample of predictors found in the other sample, for example, "compliance" had only a .19 correlation and "look around" a -.01 with reading for higher SES students. It seemed in arithmetic that the difference in SES is a major contributor to the predictiveness of survival skills. The analysis in reading, while superficially looking similar for both groups, could provide cross validation in only one direction. The three most powerful predictors for high SES were "volunteering," "attending," and "initiation to teacher"; the final multiple R was .50. For lower SES the only predictor that added more than 5% to the variance accounted for was "attending" with an r of .56. The possibility of cross-validating from lower SES to higher SES with significant results was not expected as the zero-order correlation of attending to reading achievement for high SES was .03. However, the zero-order correlations for lower SES on the three predictors for high SES were all in the same direction and ranged from .14 to .56.

Additionally, the category "talk to teacher about academic

Table 13

For high and low socio-economic status first graders, the name of reading and arithmetic predictors that accounted for more than five per cent of the variance in order of their entrance into stepwise regression equation with r's, R's, and sign of zero-order correlation for each predictor. List of significant ($p < .01$) zero-order correlations between survival skills and achievement.

Arithmetic by socio-economic status

	High SES N=41			Low SES N=70	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
–	TTN	.38 r	+	CO	.42 r
–	PL	.46 R	-	LO	.47 R**
–	AT	.54 R			
–	TTP	.62 R**			
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	TTP	-.36		CO	+.42
	TTN	-.38		LO	-.41
	(CO	+.19) ✗		(TTN	-.02) ✗
	(LO	-.01)		(PL	-.13)
	(PL	-.24)		(AT	+.17)
	(VO	+.19)		(TTP	-.11)
	(IT	+.13)			
	(AT	-.07)			

✗ Behaviors in parentheses are non significant at .01 level, but are included to provide comparison with major variables in other achievement regression equations.

**$p < .01$

Table 13--continued

Reading by socio-economic status

	High SES N=48			Low SES N=74	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
+	VO	.40 r	+	AT	.56 r**
+	AT	.45 R			
+	IT	.50 R**			
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	VO	+.40		VO	+.27
	(AT	+.03) ⁑		AT	+.56
	(IT	+.22)		PL	-.28
	(CO	+.07)		LO	-.47
	(LO	-.07)		NA	-.43
	(TTN	-.05)		(IT	+.14) ⁑
	(PL	-.01)		(TTN	+.09)
				(CO	+.16)

⁑ Behaviors in parentheses are non significant at .01 level, but are included to provide comparison with major variables in other achievement regression equations.

**p .01

material" provided a significant negative correlation of .36 to arithmetic achievement for high SES children. A post hoc explanation of this finding suggests that the teacher spends more time working with those children who are having difficulty with the subject matter and thus a negative correlation between that behavior and achievement is likely to result. Because of the group effect it was not possible to determine the actual correlation between "talk to teacher about academic material" and reading achievement, but it is hypothesized that the same result would be obtained.

One other consistent finding was the greater number of significant zero-order correlations between survival skills and achievement that were found for lower SES children than for higher SES children. Overall, the relationships found indicated that the lower SES children exhibited survival skills at lower rates and with greater variability than did higher SES children. And the relationships between specific survival skills and achievement were consistently in the predicted direction in both achievement areas for lower SES children, whereas the relationships for higher SES children were in the predicted direction for reading but only for some variables for arithmetic. Cross validation between the two groups were unlikely except for reading from high SES to low SES.

Sex and First Grade Academic Achievement

The question was asked of the importance played by sex in the relationship of survival skills to first grade academic achievement. After the entire sample was divided into male and female components,

correlational analyses of composite appropriate skill behaviors to achievement were performed. The results indicated that boys generally had higher achievement scores than girls in both arithmetic and reading--a finding that was different than that generally reported in the literature. The relationship of composite survival skills to achievement in both arithmetic and reading was higher for boys than for girls. The boys' composite survival skill behaviors resulted in correlations of .37 for arithmetic and .55 for reading. For girls, the correlations between composite survival skill behaviors and achievement were .29 for arithmetic and .45 for reading (Table 14).

The regression analysis relating specific survival skills to achievement produced similar findings of stronger relationships for boys than for girls (Table 15). The multiple R in arithmetic of .63 for boys and .48 for girls were substantially stronger than the correlation of .37 for boys and .29 for girls between the composite survival skill scores and arithmetic achievement. In reading the correlations of .55 for boys and .31 for girls between the composite skill score and reading achievement were increased to multiple R's of .71 for boys and .45 for girls by using a combination of specific survival skills as predictors. All the behaviors which entered the regression equation, except for "talk to teacher positive" by girls in arithmetic, were in the predicted direction.

For girls, the variable "look around" was the most powerful predictor in both reading and arithmetic. An examination of zero-order correlations for the boys in reading and arithmetic revealed that "look around" was also a significant correlate of achievement, producing

Table 14

Mean and standard deviation of percentage of time male and female first graders engaged in appropriate survival skill behaviors during reading and arithmetic periods; mean percentile achievement level and standard deviation as measured by Stanford Achievement Test, and correlation between composite survival skill percentages and academic achievement

	Arithmetic			Reading	
	Males N=55	Females N=80		Males N=63	Females N=87
Mean percentage of appropriate survival skill behaviors	82%	83%	Mean percentage of appropriate survival skill behaviors	84%	88%
Standard deviation	9%	8%	Standard deviation	12%	10%
Mean percentile achievement level	61	54	Mean percentile achievement level	48	45
Standard deviation	27	27	Standard deviation	26	27
Correlation of composite appropriate survival skill behaviors and achievement	.37***	.29***	Correlation of composite appropriate survival skill behaviors and achievement	.55****	.31***

***p .005
****p .0005

Table 15

For male and female first graders, the name of arithmetic and reading predictors that accounted for more than five per cent of the variance in order of their entrance into stepwise regression equation with r's, R's, and sign of zero-order correlation for each predictor. List of significant ($p < .01$) zero-order correlations between survival skills and achievement.

Arithmetic by sex

	Males N=35			Females N=80	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
+	CO	.44 r	-	LO	.43 r
-	NC	.54 R	-	TTP	.48 R**
-	TTN	.63 R**			
	Survival skill	r		Survival skill	r
Significant zero-order correlations ($p < .01$) between specific survival skills and arithmetic achievement	CO	+.44		LO	-.43
	LO	-.35		TTP	-.26
	(NC	-.11) ✗		AT	+.26
	(TTN	-.21)		(CO	+.18) ✗
	(TTP	-.08)		(NL	-.02)
	(AT	+.19)		(TTN	.00)
	(IT	-.01)		(IT	+.05)
	(VO	+.20)		(VO	.00)

✗ Behaviors in parentheses are non significant at .01 level, but are included to provide comparisons with major predictors in other achievement regression equations.

**$p < .01$

Table 15--continued

Reading by sex

	Males N=63			Females N=87	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
+	AT	.64 r	-	LO	.36 r
+	IT	.71 R**	+	VO	.45 R**
	Survival skill	r		Survival skill	r
Significant zero-order correlations ($p < .01$) between specific survival skills and reading achievement	AT	+.64		LO	-.36
	IT	+.53		VO	+.34
	LO	-.49		AT	+.34
	NA	-.55		PL	-.27
	(CO	+.06) ‡		NA	-.25
	(NC	-.12)		(CO	+.12) ‡
	(TTN	+.15)		(NC	-.18)
	(VO	+.43)		(TTN	+.09)
				(IT	+.19)

‡ Behaviors in parentheses are non significant at .01 level, but are included to provide comparisons with major predictors in other achievement regression equations.

**$p < .01$

negative correlations of .35 in arithmetic and .49 in reading. As had been found for the 134 first graders for whom data were available for both reading and arithmetic, "look around" was a variable that cut across academic situations, being a powerful predictor in both reading and arithmetic. The same finding was true for lower SES children, and again appeared in the present analysis by sex. The consistency of the results suggested that many first graders of both sexes from the lower SES backgrounds have failed to respond to relevant academic stimuli in their environment and instead produced competing responses of searching in the environment for other kinds of stimulation.

The hypothesis that stronger relationships existed for boys than girls between achievement and specific survival skills concerning following teachers' requests and instructions was partially confirmed. "Compliance," which had been the second most powerful predictor for arithmetic when the sexes were combined, became the most powerful predictor for boys' arithmetic achievement when the regression equations were generated separately by sex. In fact, the two most powerful predictors for arithmetic for boys were "compliance" and "noncompliance," which in combination produced a multiple R of .54. The zero-order correlations for both survival skills for girls were nonsignificant in relationship to arithmetic achievement. Thus, for arithmetic the hypothesis that boys would produce stronger relationships between specific survival skills having to do with following teachers' requests was supported. For both boys and girls in reading, the relationships between "compliance" and "noncompliance" were nonsignificant. The *post hoc* explanation for the finding of nonsignificance was the nature of

contol that can be exerted by the teacher in small reading groups versus the relative freedom allowed in the arithmetic situation in which the teacher has many more children to attend to and consequently is less likely to follow through consistently on her requests.

In summary, the child's sex did provide evidence that stronger relationships between survival skills and achievement existed for boys than for girls. The most powerful predictor for girls, which was "look around," was applicable to both reading and arithmetic achievement, and at the same time had moderate correlations in both achievement areas for boys, but did not enter the regression equations for boys because more powerful predictors were available. Support for the hypothesis that survival skills based on following teacher's instructions would be more predictive of academic success for boys than for girls was partially supported. The combination of these results suggested that for some survival skills, e.g., "compliance," the child's sex may be of major importance, but that for other survival skills, e.g., "look around," the sex of the child is of less importance.

Sex by Socioeconomic Status and Academic Achievement

The last series of analyses was performed to determine the effect of both socioeconomic status and sex on the relationship of survival skills to behavior. As both sex and socioeconomic status had marked influences on the relationship, it was hypothesized that the combination of the two variables would provide even stronger and more distinct relationships than had been true with the previous analyses.

Arithmetic Achievement, SES, Sex, and Survival Skills

As shown in Table 16, the male-female dichotomy for high and low SES for arithmetic achievement did not produce any major differences between the sexes within SES categories. High SES males and females spent 85% to 87% of their time engaged in appropriate survival skill behaviors; the variance for the male and female was minimal--5% to 7%. For low SES males and females the same generalization held; while they spent less time in appropriate survival skill behavior than high SES first graders, the difference between the sexes was 2%, and no difference occurred in the variance. The achievement levels showed greater difference between SES groups than within SES groups by sex; both male and female high SES first graders achieved at the 72nd percentile while low SES males achieved at the 51st percentile versus 45th for the females. The correlations between composite survival skills and achievement showed similar relationships by sex within but not across SES groups; the relationships were non-significant for high SES males or females and were .38 and .36 for low SES males and females respectively. Thus, in reading achievement, output of appropriate survival skill behaviors, and the relationship between the two, SES was a more powerful discriminator than sex.

The regression analysis results for arithmetic produced higher multiple R's than had the correlational analysis between composite survival skill and arithmetic achievement (Table 17). The multiple R's ranged from .40 to .93. Greater consistency occurred for lower SES boys and girls in the survival skills that were chosen as powerful predictors of reading achievement than was true for high SES boys and girls. For low SES males, the behaviors "compliance" and "look around" resulted

Table 16

Mean and standard deviation of percentage of time high and low socio-economic status first graders by sex engaged in appropriate survival skill behaviors during arithmetic, correlation between percentages of time and arithmetic achievement, mean percentile achievement level and s.d. as measured by Stanford Achievement Test.

	High SES			Low SES	
	Males N=18	Females N=23		Males N=27	Females N=43
Mean percentage of appropriate survival skill behaviors	87%	85%	Mean percentage of appropriate survival skill behaviors	78%	80%
Standard deviation	5%	7%	Standard deviation	9%	9%
Mean percentile achievement level	72	72	Mean percentile achievement level	51	45
Standard deviation	22	25	Standard deviation	30	23
Correlation of composite appropriate survival skill behaviors and achievement	-.08 n.s.	.10 n.s.	Correlation of composite appropriate survival skill behaviors and achievement	.38*	.36**

*p < .05
**p < .01

Table 17

For high and low socio-economic status male and female first graders the name of arithmetic predictors that accounted for more than five per cent of the variance in order of their entrance into stepwise regression equation with r's, R's, and sign of zero-order correlation for each predictor. List of significant ($p < .01$) zero-order correlations between survival skills and achievement.

Arithmetic

	High SES males N=18			High SES females N=23	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
-	PL	.55 r	-	TTP	.51 r
-	TTN	.66 R	+	IT	.60 R*
-	AT	.80 R			
+	IL	.89 R			
+	AP	.93 R**			
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	PL	-.55		TTP	-.51
	(TTN	-.10) ⁑		TTN	-.49
	(AT	-.27)		IT	+.08
	(IL	+.37)		(PL	+.06) ⁑
	(AP	+.19)		(AT	+.04)
	(TTP	-.10)		(IL	+.11)
	(IT	+.20)		(AP	+.02)
	(CO	+.09)		(LO	-.36)
	(LO	+.31)		(CO	+.28)

⁑ Behaviors in parentheses are non significant at .01 level, but are included to provide comparisons with major variables in other achievement regression equations.

*$p < .05$

**$p < .01$

Table 17--continued

Arithmetic

	Low SES males N=27			Low SES Females N=43	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
+	CO	.70 r	-	LO	.40 r**
-	LO	.77 R**			
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	CO	+.70		LO	-.40
	LO	-.41		(PL	-.18) ⁑
	(PL	-.13) ⁑		(TTN	+.12)
	(TTN	-.23)		(AT	+.23)
	(AT	+.13)		(IL	-.19)
	(IL	-.37)		(AP	.00)
	(AP	+.24)		(TTP	-.16)
	(TTP	-.11)		(IT	+.10)
	(IT	+.07)		(CO	+.22)

⁑ Behaviors in parentheses are non significant at .01 level, but are included to provide comparison with major variables in other achievement regression equations.

*p < .05
**p < .01

in a multiple R of .77, and for low SES females, the behavior "look around" was the only variable that added more than 5% in the regression analysis to predict achievement. The correlation of -.40 for low SES females between "look around" and achievement in arithmetic matched the correlation of -.41 between "look around" and arithmetic achievement for low SES males. For lower SES males, the behavior "compliance" that had been highly predictive of arithmetic achievement for all males in the earlier male-female analyses provided even stronger relationships in this analysis. The zero-order correlation was a robust .70 for the lower SES boys and provided evidence supporting the hypothesis that boys would have stronger relationships between behaviors regarding following teacher's requests and achievement than would girls. Lower SES girls produced a non-significant correlation of .22 between "compliance" and arithmetic achievement. However, for upper class boys, the hypothesis was disconfirmed, which suggested that the majority of high SES boys have learned to follow simple requests, while lower class boys display more variability in the behavior.

For high SES males and females the variables chosen were idiosyncratic; "play," which had a correlation of -.55 for boys, had a non-significant positive correlation of .06 for high SES females. The major predictor for high SES females was "talk to teacher about academic material" and the correlation was -.51, while for high SES boys, the correlation was non-significant and -.10. The combination of idiosyncratic relationships, either in the reverse of the predicted direction or of significantly different magnitudes for high SES students, produced the differences in regression analysis and also accounted for

the nonsignificant correlations between the composite survival skill behaviors and achievement in arithmetic. For lower SES, the specific survival skills and arithmetic relationships were in the predicted direction for both boys and girls, and, except for "compliance," of similar magnitudes, which may account for the similar correlations between composite survival skills and achievement.

Reading Achievement, SES, Sex, and Survival Skills

The generalization regarding SES and sex found in arithmetic was also found in the reading results. As shown in Table 18, the high SES male and female first graders resembled each other more than they resembled low SES males and females. The mean percentage of appropriate behavior was higher, standard deviation lower, and overall achievement level in reading was higher for high SES males and females. The correlation with reading achievement and composite survival skill score was nonsignificant. Differences between male and female of high SES status was not evident from the gross measures. The lower SES males and females had more differences between themselves, but were closer, with one exception, on every measure to themselves than they were to the high SES males or females. The only exception was low SES females had a mean percentage of appropriate skill behaviors of 86% that was closer to the 89% of high SES females and the 90% of high SES males than to the 79% of the low SES males. The standard deviation was twice as large for low SES males and females than was true for high SES males and females who had a standard deviation of only 6%. The reading achievement was at the 36th percentile for both low SES males and

Table 18

Mean and standard deviation of percentage of time high and low socio-economic status first graders by sex engaged in appropriate survival skill behaviors during reading groups, correlation between percentage of time and reading achievement, mean percentile achievement level and s.d. as measured by Stanford Achievement Test.

	High SES			Low SES	
	Males N=23	Females N=25		Males N=29	Females N=46
Mean percentage of appropriate survival skill behaviors	90.2%	89.4%	Mean percentage of appropriate survival skill behaviors	79.2%	85.9%
Standard deviation	5.7%	5.8%	Standard deviation	14.7%	11.5%
Mean percentile achievement level	61	60	Mean percentile achievement level	37	36
Standard deviation	17	25	Standard deviation	28	25
Correlation of composite appropriate survival skill behaviors and achievement	.09 n.s.	.01 n.s.	Correlation of composite appropriate survival skill behaviors and achievement	.55**	.41**

**p < .01

females versus approximately the 60th percentile for high SES males and females. The correlations between the composite score for survival skills and reading achievement were .55 for low SES males and .41 for low SES females, considerably higher than the non-significant results for high SES males and females. As was noted in the arithmetic analysis, the significant variables for the gross measures seem to be affected more by SES than be sex.

The results of the regression analysis on specific survival skill data and reading achievement produced generalizations similar to those found for arithmetic achievement (Table 19). Lower SES children produced survival skill predictors of achievement that were more similar across sex than was true for high SES males and females. The multiple R's for each group which ranged form .52 to .75 were again higher than was true for the correlations of composite scores and achievement. The most powerful predictor for high SES males was "self stimulation" and for high SES females "volunteering." As was found for high SES males and females in arithmetic, the correlations were idiosyncratic, e.g., "self stimulation" had a negative correlation of .50 with reading achievement for males and a nonsignificant positive correlation of .24 with reading achievement for females. "Volunteering" had a positive correlation of .49 for girls and nonsignificant .28 for boys.

For low SES males and females, the most powerful predictor was "attending" which provided a correlation of .70 with reading achievement for the boys and a correlation of .47 for the girls. As was noted for the relationship between arithmetic achievement and specific survival skills, low SES males and females produced relationships that were

Table 19

For high and low socio-economic status male and female first graders, the name of reading predictors that accounted for more than five per cent of the variance in order of their entrance into stepwise regression equation with r's, R's, and sign of zero-order correlation for each predictor. List of significant ($p < .01$) zero-order correlations between survival skills and reading achievement.

Reading

	High SES males N=23			High SES females N=25	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
- + -	SS IT CO	.50 r .57 R .63 R*	+ +	VO IL	.49 r .54 R**
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	SS (IT (CO (VO (IL (AT	-.50 +.26) ⁑ -.29) +.28) +.22) +.12)		VO (IL (SS (IT (CO (AT	+.49 +.18) ⁑ +.24) +.21) +.26) -.02)

⁑ Behaviors in parentheses are non significant at .01 level, but are included to provide comparison with major variables in other achievement regression equations.

*$p < .05$
**$p < .01$

Table 19--continued

Reading

	Low SES males N=29			Low SES females N=46	
Sign of zero-order r	Survival skill	r and multiple R	Sign of zero-order r	Survival skill	r and multiple R
+	AT	.70 r	+	AT	.47 r
+	IL	.75 R**	+	IT	.52 R**
	Survival skill	r		Survival skill	r
Significant zero-order correlations between specific survival skills and achievement	AT	+.70		AT	+.47
	IL	+.41		LO	-.41
	LO	-.53		(SS	+.05) ⁑
	NA	-.61		(IT	+.18)
	(SS	-.10) ⁑		(CO	+.04)
	(IT	+.01)		(VO	+.23)
	(CO	+.31)		(IL	-.25)
	(VO	+.40)			

⁑ Behaviors in parentheses are non significant at .01 level, but are included to provide comparison with major variables in other achievement regression equations.

*p < .05
**p < .01

somewhat similar. In formulating and carrying out intervention programs to assist handicapped lower SES children in increasing survival skill activities for reading achievement, the emphasis need not concentrate on distinctive behaviors for each sex, but rather reinforcers that may be idiosyncratic to sex.

Overall, the last analysis involving SES, sex, survival skills, and achievement indicated that on gross measures first graders of either sex resembled each other more than they resembled children of either sex from a different SES grouping. Higher SES children achieved at mean levels 25 percentile points above their low SES peers; they exhibited higher levels of appropriate survival skill behavior and showed very little variability among themselves in the level of appropriate behavior. Additionally, the relationship of composite survival skill behaviors to achievement was nonsignificant for high SES boys and girls, whereas for low SES children, the correlations were in the moderate range. On the relationship of specific survival skills and achievement, the high SES males and females differed dramatically, while the low SES males and females generally produced similar strong relationships.

Discussion

The results answered several questions regarding the relationship of survival skills and first grade academic achievement. The relationship does exist across all children and becomes more powerful in several respects as moderator variables are introduced. By considering social class as a moderator, it is possible to increase substantially the relationship between survival skills and achievement. In general

the lower class children exhibited more variability in their behavior and the relationships of their survival skills to achievement are more predictable than is true for the upper class children. Sex of child seemed to play a less important role as a moderator except for behaviors having to do with following teacher's requests. By considering both sex and SES, the most powerful predictions for achievement from survival skills was accomplished.

The idiosyncratic quality of many of the relationships for upper SES children suggests the need for further study with larger groups of these children in order to replicate the current findings as well as to seek out answers to the reasons that the relationships exist as reported in this report. The results from the lower class boys and girls were consistent with all the hypotheses that were stated, which suggests that the next research effort is to begin working with handicapped children who are deficient in the survival skills that have been pinpointed. No cause and effect relationship has been shown between the skills and achievement and that is one aspect of the next research endeavor: to increase the pinpointed survival skill of handicapped children in an academic area and test for concommitant increase in achievement. Currently pilot work is being carried on wtth handicapped first graders to test out the cause of effect relationship between survival skills and achievement.

A mixture of stability and flux characterizes the findings regarding survival skills across academic settings. Some behaviors were crucial to academic success in both settings, while others were situation specific. Some children's behaviors were more stable than other

behaviors from one situation to another. This empirical evidence provides support for the theoretical significance of situational variables in accounting for behavior and at the same time points to implications of practical significance for searching out educationally relevant variables in the classroom environment. As has been clearly demonstrated by several investigators, a theory of human behavior needs to be based on what the person does, given various stimulus and reinforcement conditions in order to accurately explain, predict, and change human behavior (Patterson & Cobb, 1970; Mischel, 1969).

A major research question that looms from the current report is how do children get to be so different in these behaviors by the time they reach the first grade. Upper SES children showed little variability in contrast to lower SES children. The question may not be answered by simply comparing lower and upper class home environments because many of the children in the lower and upper class had suitable levels of survival skil and were achieving at acceptable levels. Observational data collected in the homes of those lower SES children who are performing poorly might be compared to data collected in homes of high achieving children of low SES. Zunich's (1962) finding suggests that some differences do exist in the way that parents interact with their children when intellectual tasks are to be performed. It is anticipated that the children who are performing poorly will have the same deficits in the home on survival skills either because the opportunity never arises for practice or when the survival skills are exhibited no social reinforcement is provided by significant persons in the home environment.

The search for answers within the home does not exclude the

possibility of the school playing a major role in planned programming of survival skill training for youngsters entering the school system. Given that there is a cause and effect relationship, it seems like a short jump to implementation of procedures to assure that each child have those skills at adequate levels within a few months of entering the school system. The significance of such a procedure is envisioned to substantially reduce the number of children labeled with varying kinds of emotional and learning disorders by the time they reach the upper primary grades. The 11% of the children out of 134 in the present study who were performing below the 21st percentile in both reading and in arithmetic could use some help before they join the ranks of the chronic failures.

The relative simplicity of the observational procedure suggests the possibility of using the method as a sensitive assessment instrument by school personnel working with children in the classroom. Not only might entering first graders who have low levels of survival skills be identified and helped, but <u>any</u> child whose level of appropriate survival skills decreases below a minimal level would be an immediate signal to teachers that the child is experiencing difficulty in the classroom situation. With some training provided for teachers, it seems possible that they could readily learn to spot children who are falling behind their peers in survival skill behaviors. Observation data collected by the teacher, teacher's aide, or the peers would substantiate or disconfirm the teacher's original hypothesis. Once the data are collected the teacher could then decide upon a course of action to remediate the situation. Remediation could be immediate and might include

individualizing the curriculum which may be the problem or providing more potent social reinforcement for appropriate survival skill behavior in order to bring the child back to an acceptable survival skill level which hopefully would enhance the child's educational development.

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